

Application Serial No. 10/813,538
Reply to office action of April 19, 2006

PATENT
Docket: CU-3660

REMARKS/ARGUMENTS

Reconsideration is respectfully requested.

Claims 1-3 and 10-16 are pending in the present application before this amendment. Claims 4-9, 17 and 18 have been withdrawn. New claims 19-21 have been added and support, among others, can be found in original claims 1-4. By the present amendment, and claims 10, 12 and 14 have been amended. No new matter has been added.

REJECTION OF UNDER 35 USC §112 ¶2

In the Office Action claims 12 and 13 stand rejected under 35 USC §112 ¶2 as being alleged to be indefinite because in claim 12 the presence of the subscript x in SiO_x, SiON_x and SiN_x are not defined.

Regarding claim 12, the Applicants have subsequently amended claim 12 by replacing the terms SiO_x, SiON_x and SiN_x with the corresponding respective terms of silicon oxide, silicon oxynitride and silicon nitride. Support for these nomenclature changes can be found in the specification, among others at p. 5-6 l. 27 and 1-2, respectively; p. 6, l. 10-12; p. 6, l. 20-21; p. 8, l. 6-8; p. 8, l. 5-7; p. 8, l. 6-8, p. 10, l. 16-17, p. 10 l. 19-20. Therefore the basis for this rejection of claim 12 has been removed.

Regarding claim 13, the Applicants consider that claim 13 is rejected because it is a dependent claim of claim 12 which had included the allegedly indefinite terms "SiO_x", "SiON_x", and "SiN_x" prior to the removal of these terms in newly amended claim 12. Since claim 12 has been amended by removing these allegedly indefinite terms then the basis for this rejection of claim 13 has also been removed.

Therefore this rejection of claims 12 and 13 should be withdrawn.

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FIRST REJECTION UNDER 35 USC §103

In the Office Action, claims 1-3 stand rejected as being unpatentable over Sugimoto (U.S. Pat. Appl. No. 2002/0093825). The Examiner alleges that Sugimoto teaches all of the claimed elements of claims 1-3 except for teaching the particular elemental ratios (i.e., SiOxNy) as required in the present invention.

The Applicants gratefully acknowledges that the Examiner admits that Sugimoto does not teach SiOxNy with the requisite Si/O/N elemental ratios at 100/X/Y where $130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$.

The Applicants respectfully disagree that Sugimoto teaches all of the claimed elements because Sugimoto is a non-enabling reference for making SiOxNy at these particular concentrations. That is, the Applicants contend that the Sugimoto reference cannot possibly enable a person skilled in the art make SiOxNy with the requisite Si/O/N elemental ratios at 100/X/Y where $130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$ without burdening that person with undue experimentation.

The Applicants have already presented arguments in the specification, supported by examples, which show that Sugimoto is a non-enabling reference. In particular, in the originally submitted specification, the Applicants have raised this very issue that Sugimoto was "*an uncertain factor regarding the quality thereof.*" (See spec. p 3 lines 9-16). The Applicants pointed out that Sugimoto introduced bombarding oxygen gas onto a SiN target, which is known to have a slow sputter rate (See spec. p. 3 l. 25-26), in order to produce any SiOxNy from the sputtered SiN fragments. The problem is that nitriding was at most negligible and at worst never observed in the resultant film when using the Sugimoto method (See Comparative Examples 1 and 2 in the spec. pp. 31-33).

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tables 3 and 4). The end result of using the Sugimoto method was that it produced mostly SiOx films. The Applicants speculated that the reason why nitriding failed by using the Sugimoto method was that nitrogen discharged from the target collided with oxygen, which has high reactivity, before arriving at the substrate. Thus the nitrogen was deprived of its activity and oxygen was preferentially incorporated into the film as SiOx instead of as SiOxNy. (See spec. p. 33 lines 13-16)

The Sugimoto method uses oxygen in the gas whereas "[t]he present inventors have found a method of forming a desired SiOxNy film that inhibits SiOx formation of a protective coat with good reproducibility by using nitrogen gas rather than oxygen as a reactive gas to be introduced at a time of a film formation reaction." (See spec. pp. 14-15 lines 24-27 to lines 1-2, respectively). Therefore the use of nitrogen gas and not oxygen as a reactive gas is desirable as a means of making SiOxNy with the present invention O/N elemental ratios restrictions (i.e., x and y) that provide the SiOxNy of present invention.

Further, as pointed out in the present invention, the composition ratio of silicon oxynitride film, Si/O/N is quite important for the barrier property thereof and this compositional ratio was first found by the Applicants. (See specification at pp. 10-11 lines 17-27 and lines 1-12, respectively).

Since Sugimoto does not disclose how to make the SiOxNy as required in claims 1-3, then Sugimoto cannot possibly teach the composition of SiOxNy as required in claims 1-3. Accordingly, a person skilled in the art could not be considered to be able to make SiOxNy with the requisite concentrations of Si/O/N at $100/X/Y$ ($130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$) without being burdened with undue experimentation when using

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Sugimoto's oxygen gas SiN sputtering methodology. Therefore, this obviousness rejection of claims 1-3 based on Sugimoto should be withdrawn because Sugimoto does not teach each limitation of the claims 1-3.

In addition, the Applicants respectfully contend that the Examiner's assertion that altering the proportions of the film components is a routine manner is improperly based because it requires that a person skilled in the art would have to know to not only to alter the proportions but would also have to radically alter the method of making the material (i.e., changing the oxygen gas sputtering bombardment on a SiN target into a nitrogen gas sputtering bombardment on a Si_3N_4 target). Therefore, the Examiner's assertion is improperly based.

Therefore, for any and all of the above reasons, this rejection of claims 1-3 should be withdrawn.

SECOND REJECTION UNDER 35 USC §103

In the Office Action, claims 1-3 and 10-16 stand rejected as being unpatentable over Tazawa (U.S. Pat. Appl. 2002/0043929) because Tazawa allegedly teaches all of the claimed elements except teaching the relative amounts of the components in the film Si, O, and N of the present invention.

Regarding claims 1-3, the Applicants respectfully disagree that Tazawa teaches all of the claimed elements because Tazawa is a non-enabling reference for making SiO_xN_y. In particular the Tazawa reference cannot be considered to be a suitably enabling reference that could possibly provide a person skilled in the art enough guidance on how to make SiO_xN_y let alone how to make SiO_xN_y with the requisite

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Si/O/N elemental ratios at $100/X/Y$ where $130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$ without burdening the person skilled in the art with undue experimentation.

The Applicants gratefully acknowledges that the Examiner admits that Tazawa does not teach SiOxNy with the requisite Si/O/N elemental ratios at $100/X/Y$ where $130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$.

The above arguments are equally applicable here in that Tazawa is not an enabling disclosure. Tazawa can't even spell SiOxNy (Tazawa in para [0058] uses SIO_N). Further Tazawa provides no guidance on how to make SiOxNy let alone how to make SiOxNy with the requisite Si/O/N elemental ratios of $100/X/Y$ at $130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$ without burdening a person skilled in the art to endure undue experimentation.

Since Tazawa does not disclose how to make the SiOxNy as required in claims 1-3, and then Tazawa cannot possibly teach the composition of SiOxNy as required in claims 1-3. Accordingly, a person skilled in the art could not be consider to be able to make SiOxNy with the requisite concentrations of Si/O/N at $100/X/Y$ ($130 \leq X+Y \leq 180$, $10 \leq X \leq 135$, $5 \leq Y \leq 150$) without being burdened with undue experimentation when using Tazawa's unknown and consequently un-enabling methodology.

Therefore, this obviousness rejection of claims 1-3 based on Tazawa should be withdrawn because Tazawa does not teach each limitation of the claims 1-3.

Regarding claims 10-16, the Examiner alleges that "Tazawa teaches EL devices comprising first and second layers formed on a resin substrate (abstract). The layers may be formed of such materials as silicon oxide, silicon nitride and silicon oxynitride (see Tazawa paragraph [0057]-[0059]). Moreover Tazawa teaches that the materials of

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one layer, e. g., SiON, is a functional equivalent of components of other layers, e. g., alumina (id.). Therefore, it would have been obvious to employ the presently claimed materials in the structure of Tazawa, since Tazawa suggests the use of such materials."

Indeed, in Tazawa, two or more layers are formed on the plastic substrate. The most relative disclosed layered structure in Tazawa comprises a gas barrier layer 3(SiO_x, Al₂O₃, SiON), a top coat layer (TiO₂), heat radiation layer 4 (Ag, Au, Al, SiC, BeO, AlN, Al₂O₃), insulating layer 5 (SiO_x, Al₃N₄, Al₂O₃) formed on the plastic substrate, in this order (see, Tazawa paragraph [0057]-[0059], as well as Tazawa paragraph [0061] and [0067]). However, the Applicants respectfully point out that Tazawa does not teach, disclose or even motivate that the two protective layers can be formed on the top surface of a substrate, or on the top surface of a thin film layered body formed on the substrate so that a first layer is thin and a second layer is thick.

As required in amended claim 10, in this invention, the first layer is an oxide film and the second layer is a nitride oxide film or a nitride film, and wherein the first layer has a thickness of 200Å - 1500Å, and the second layer has a thickness of 1500Å - 3000Å.

Although in Tazawa, the thickness of the respective layers are not particularly limited, but as shown in the example in Tazawa, there is a description that the thickness of the gas barrier layer 3 (corresponding to the first layer of this invention) is 5μm, namely, 50000Å. As compared with the thickness of the first layer of this invention, the thickness of the gas barrier layer 3 of Tazawa is significantly largest. Thus, the layered construction of Tazawa is quite different from the two layered protective film of this invention.

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Therefore, this obviousness rejection of claims 10-16 based on Tazawa should be withdrawn because Tazawa does not teach each limitation of the claims 10-16.

In conclusion this obviousness rejection of claims 1-3 and 10-16 based on Tazawa should be withdrawn because Tazawa does not teach each limitation of the claims 1-3 and 10-16.

REJECTION UNDER 35 USC §102(e)

The Applicants would like to confirm that Haoto of co-pending U.S. Application No. 10/755931 is the same individual as inventor Haoto of this application. Thus, the Applicants are assured that this rejection under U.S.C. 102(e) can eventually overcome. Therefore, the Applicants are prepared to submit an affidavit response under 37 CFR 1.131 and/or under 37 CFR 1.132 to overcome this rejection when this rejection is imposed in the subsequent office action.

REJECTION UNDER DOUBLE PATENTING

The Applicants respectfully request the Examiner to postpone this provisional rejection and convert such provisional rejection into a non-provisional one, in one of the two applications, as soon as the other receives a patent grant.

SUMMARY

For the reasons set forth above, the applicants respectfully submits that claims 1-3 and 10-16, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicants respectfully requests reconsideration and withdrawal of the outstanding rejections and earnestly solicits an indication of allowable subject matter. This amendment is considered to be responsive to all points raised in the office action. Should the examiner have any remaining questions or concerns, the

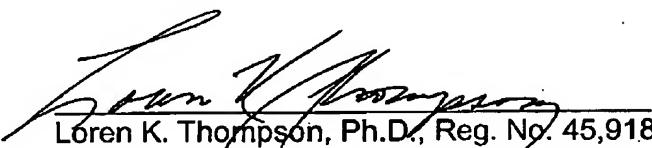
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examiner is encouraged to contact the undersigned attorney by telephone to
expeditiously resolve such concerns.

Respectfully submitted,

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Loren K. Thompson, Ph.D., Reg. No. 45,918
Ladas & Parry LLP
224 South Michigan Avenue
Chicago, Illinois 60604
(312) 427-1300